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SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

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June 29, 1929

MEET THE NEANDERTHALERS!

Cave Life, 50,000 Years Ago, Revived At Field Museum

(*See page* 399)

Vol. XV No. 429

Refrigeration Cools Congress

Engineering

"Twenty degrees cooler inside." This sign, while always somewhat exaggerated for artistic psychological effect, may now be posted not only on Washington movies, but on the U. S. Capitol building as well.

Members of the House of Representatives, in fact, for the past two sessions have been provided with the cleanest air possible to obtain by artificial means, and have had the temperature of the room in which they work held to a steady average of 70 to 73 degrees Fahrenheit in the winter months, regardless of nipping winds or snow outside.

Now that Washington's torrid summer is here, the refrigerating possibilities of the new ventilating system are being tested. A steady temperature of from seven to ten degrees lower than outdoor thermometer registrations is being maintained. Because the excess moisture is being removed from the air before it is circulated in the House chamber and galleries, its temperature actually seems cooler than it is, and a poll of guesses from tourists and Congressmen would estimate the temperature to be around 72 or 73 degrees, whereas a thermometer indicates it to be 80 or 82 degrees Fahrenheit, on "ninety-degree" days.

The U. S. Public Health Service, which has cooperated with the Capitol Engineers' Office in handling the new ventilating system, states that while it is a common impression that a house temperature of around seventy degrees would be ideal both winter and summer, that this is actually not the case, inasmuch as this would mean too great a change in summer, when one comes in from the outer air.

Manufacturers of the apparatus by which the air in the House is now regulated are careful to insist that the system is not exactly a ventilating system, but rather an "air conditioning system." Such a system embraces not only circulation of air, and increasing or decreasing its temperature, and washing it to make it pure, but goes even further than this, and provides the air with the amount of moisture said to be most healthful. Sometimes this means that the air must be humidified; at other times, it must be dehumified.

Dehumidifying the air in the summer time, it is explained, makes its heat less noticeable, which is a matter of common knowledge, due to the prevalence of the old complaint: "It isn't the heat, it's the humidity."

It is explained that the cold air which enters into the Capitol in winter may be saturated with moisture, but becomes rather deficient in moisture content when it is heated. As it passes over the oil filters in the tunnel in Capitol Park, before it enters the Capitol, most of the dust and dirt is removed. It then goes through water sprays which are kept constantly at a temperature of about 42 degrees either winter or summer. Naturally, it either takes up or drops moisture, depending upon its temperature and degree of saturation when it entered. It always emerges from this water spray with a certain definite amount of moisture per cubic foot. Heating of this air to 64 degrees is the last step before it is sent to the House chamber and the galleries.

"The purpose of these systems," says David Lynn, architect of the Capitol, "is to give ample ventilation at all times without drafts—to give temperature regulation in all parts of the House, including the gallery, which shall be independent of outside conditions in summer as well as in winter.

"To give an appreciation of the magnitude of the undertaking, certain requirements of the House chamber may be cited:

"There is now supplied to the floor of the House and gallery 72,000 cubic feet of air per minute, thoroughly cleaned and with its temperature and humidity regulated to give the desired conditions in the Chamber. This air supply can be visualized as nearly one-fourth the entire cubic contents of this Chamber supplied every minute. Or, to express it another way, the air in the Chamber is completely changed about once every four minutes.

"It is often necessary to cool in winter as well as in summer. Scientists have shown that the average human being dissipates continuously more heat than two 50-watt electric bulbs. With the galleries and floor filled with persons, there is enough heat being given off to raise the entire amount of air introduced nearly 6 degrees."

The method of air distribution is new, Mr. Lynn also explains. It is diffused over the entire floor of the Chamber through invisible outlets in the panels of the ceiling, and is exhausted in like amount from suitable openings near the floor.

Recent tests conducted by engineers at the Capitol showed that the apparatus had taken 4 cubic feet of dirt from the air in 648 hours of operation, or representing a period of about 4 weeks. This dirt weighed one-fourth ton.

Since tests in New York theaters showed about eleven cubic feet of dirt removed from the air in one week's operation, Washington concludes that its atmosphere is in general comparatively clean.

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Cave Man's Life Resurrected

Anthropology

The first authoritative life-size reconstruction ever made of a cave man, his family, and his cave, has just been completed at Field Museum of Natural History, Chicago. The cover photograph this week, reproduced by courtesy of the Field Museum, shows a portion of the group.

The reconstruction represents one of the earliest types of prehistoric man, the ape-like Neanderthal or Mousterian man. This race lived in western Europe during the last glacial period, and represents the earliest stage of human existence of which complete skeletons have been found. The race is believed to have lived some 50,000 years ago and more.

The Field Museum group is one of the results of the recent Captain Marshall Field Archaeological Expedition to Europe, under the leadership of Henry Field, a member of the museum's anthropological staff. In the work of the expedition and the preparation of the group the museum has had the cooperation of leading anthropologists of England and France, including Professor Sir Arthur Keith, president of the Royal College of Surgeons, London; Professor G. Elliott-Smith of University College, London; Abbé Henri Breuil of Paris, who is generally considered the greatest living expert on prehistoric man, and Professor Marcellin Boule of Paris.

The designer and sculptor of the group is Frederick Blaschke of Cold Spring, N. Y., who accompanied the expedition to Europe, and has spent more than two years on the work. The scene represented is an actual Neanderthal man's cave at Le Moustier, in the Dordogne region of southwest France. The cave has been reproduced in three dimensions in the museum exhibit. A large painted background of the country near the cave sets off the reconstructed group, this feature being the work of C. A. Corwin, staff artist of the museum.

The individual figures in the group consist of a man about 55 years old, a boy about 12, a woman about 30 with a baby in her arms, and an older woman. These figures have all been carefully reconstructed from measurements, casts and models made of the skulls and skeletons of Neanderthalers which have been found in various localities in Europe. The figures are in lifelike attitudes, and are represented as engaged in occupations typical of their time and stage of development.

OLD MAN NEANDERTHAL now in the Field Museum group

The man is shown outside the entrance of the cave, having just returned from hunting. With one hand he grasps the antlers of a reindeer which he has killed with a stone implement which is seen, red with blood, in his other hand. The woman with the baby is on her way out from the inner recesses of the cave. Nearby is seen the boy, gnawing hungrily on a bone. The older woman is squatting beside a fire cleaning fat from a skin. Squatting, rather than sitting, was characteristic of these people, scientists have determined from facets on skeletons. Evidence that the Neanderthalers knew how to make fire has been found in abundance.

The special characteristics of the Neanderthal race are carefully represented. These include very prominent and continuous brow ridges extending from temple to temple; short thick necks with heads thrown forward because of a peculiar construction of the spinal column which made it impossible for these people to stand quite erect; broad flat noses; and bent knees like a gorilla's, which it was impossible for them to straighten. Their bodies were short and of stout build. Their heads were proportionately large, and the size of their brains was not much below that of modern man's, according to Dr. Oliver C. Farrington, curator of geology. While in volume their brain substance apparently equalled that of modern man, the proportions were more like those of apes, according to Dr. Farrington. The hands were extremely large, and lacked the mobility of those of modern man. The arms were relatively shorter than the legs, and the shin bones shorter than the thigh bones, thus indicating that these people were clumsy and slow-moving beings.

Flint implements obtained from one of the actual caves used by this race at Le Moustier are scattered about on the floor of the reproduced cave. The background depicts the cold rocky landscape on the bank of the Vezere River, where this rock shelter stands. As many known details as possible illustrating the anatomy, habits and environment of members of the Neanderthal race have been embodied in the group.

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$9,000,000 Research Fund

General Science

Nine millions for science is the goal toward which Cornell University has started, with the announcement of a gift from the General Education Board of $1,500,000. The project is to be completed in three steps of $3,000,000 each, of which the present gift constitutes the first half of the first unit. In its final development, $1,500,000 of the total fund is to be spent for a building and the rest is to constitute an endowment for the support of the research staff and the purchase of equipment.

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Lying as an Instrument of Warfare

Sociology

ARTHUR PONSONBY, in *Falsehood in War-Time* (Dutton):

Falsehood is a recognized and extremely useful weapon in warfare, and every country uses it quite deliberately to deceive its own people, to attract neutrals, and to mislead the enemy. The ignorant and innocent masses in each country are unaware at the time that they are being misled, and when it is all over only here and there are the falsehoods discovered and exposed. As it is all past history and the desired effect has been produced by the stories and statements, no one troubles to investigate the facts and establish the truth.

Lying, as we all know, does not take place only in war-time. Man, it has been said, is not "a veridical animal," but his habit of lying is not nearly so extraordinary as his amazing readiness to believe. It is, indeed, because of human credulity that lies flourish. But in war-time the authoritative organization of lying is not sufficiently recognized. The deception of whole peoples is not a matter which can be lightly regarded.

A useful purpose can therefore be served in the interval of so-called peace by a warning which people can examine with dispassionate calm, that the authorities in each country do, and indeed must, resort to this practice in order, first, to justify themselves by depicting the enemy as an undiluted criminal; and secondly, to inflame popular passion sufficiently to secure recruits for the continuance of the struggle. They cannot afford to tell the truth. In some cases it must be admitted that at the moment they do not know what the truth is.

The psychological factor in war is just as important as the military factor. The *morale* of civilians, as well as of soldiers, must be kept up to the mark. The War Offices, Admiralties, and Air Ministries look after the military side. Departments have to be created to see to the psychological side. People must never be allowed to become despondent; so victories must be exaggerated and defeats, if not concealed, at any rate minimized, and the stimulus of indignation, horror, and hatred must be assiduously and continuously pumped into the public mind by means of "propaganda." As Mr. Bonar Law said in an interview to the United Press of America, referring to patriotism, "It is well to have it properly stirred by German frightfulness"; and a sort of general confirmation of atrocities is given by vague phrases which avoid responsibility for the authenticity of any particular story, as when Mr. Asquith said (*House of Commons, April* 27, 1915): "We shall not forget this horrible record of calculated cruelty and crime."

The use of the weapon of falsehood is more necessary in a country where military conscription is not the law of the land than in countries where the manhood of the nation is automatically drafted into the Army, Navy, or Air Service. The public can be worked up emotionally by sham ideals. A sort of collective hysteria spreads and rises until finally it gets the better of sober people and reputable newspapers.

With a warning before them, the common people may be more on their guard when the war cloud next appears on the horizon and less disposed to accept as truth the rumors, explanations, and pronouncements issued for their consumption. They should realize that a Government which has decided on embarking on the hazardous and terrible enterprise of war must at the outset present a one-sided case in justification of its action, and cannot afford to admit in any particular whatever the smallest degree of right or reason on the part of the people it has made up its mind to fight. Facts must be distorted, relevant circumstances concealed, and a picture presented which by its crude colouring will persuade the ignorant people that their Government is blameless, their cause is righteous, and that the indisputable wickedness of the enemy has been proved beyond question. A moment's reflection would tell any reasonable person that such obvious bias cannot possibly represent the truth. But the moment's reflection is not allowed; lies are circulated with great rapidity. The unthinking mass accept them and by their excitement sway the rest. The amount of rubbish and humbug that pass under the name of patriotism in war-time in all countries is sufficient to make decent people blush when they are subsequently disillusioned.

At the outset the solemn asseverations of monarchs and leading statesmen in each nation that they did not want war must be placed on a par with the declarations of men who pour paraffin about a house knowing they are continually striking matches and yet assert they do not want a conflagration. This form of self-deception, which involves the deception of others, is fundamentally dishonest.

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Home-Made Liver Extract Effective

Medicine

A liver extract that will be effective in treating pernicious anemia can be made at home with very little effort, Dr. William B. Castle and Morris A. Bowie of Harvard University Medical School have reported to the American Medical Association.

This will prove a great boon to sufferers from this disease who are unable to afford the high price of the commercial liver extracts or of the more palatable calves' liver. Eating half a pound of beef liver a day soon becomes a tiresome ordeal, yet this has been the only chance for life and health for many of the poor who suffer from pernicious anemia.

The domestic extract is as effective as the commercial ones and may be made in the ordinary kitchen by any reasonably intelligent person, the Harvard scientists declared. Only the usual domestic utensils are needed. The cost of the beef liver is practically the only cost. The extract is palatable and may be drunk hot or cold, with or without salt. It is said to taste something like beef broth.

The process of making it consists, in general, of grinding the liver, soaking it in cold water, straining, heating and restraining. The ordinary meat grinder, strainer, enamel pots, glass jars and jelly bags found in most kitchens are the only utensils required. The success of the procedure depends on the care and exactness with which the directions for the various steps in the process are followed. Dr. Castle and Mr. Bowie gave these in detail in their report.

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Tarantulas, Scorpions, Not So Poisonous

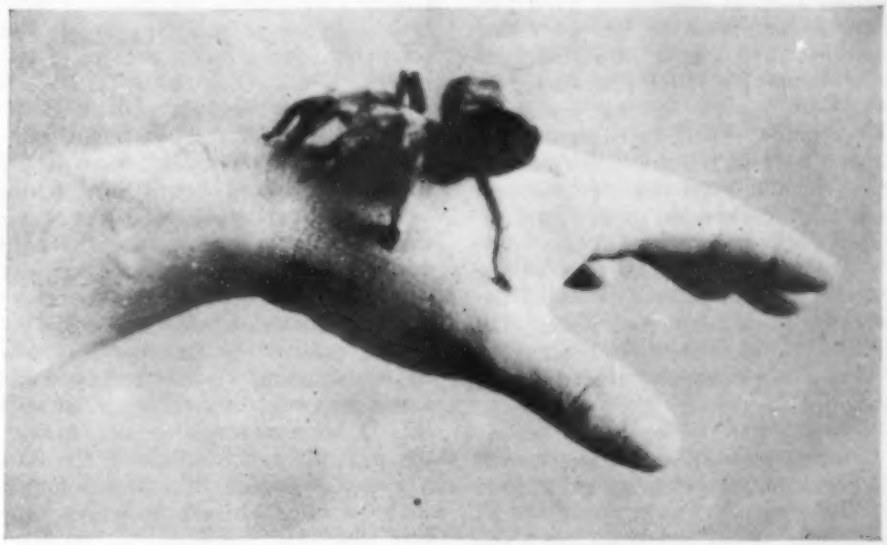
Entomology

If a tarantula bit you would you die instantly? Will the feet of a centipede leave a row of poisoned blisters where it runs across human skin?

Does the scorpion pack certain death in the sting that it carries on the end of its curled tail?

Almost all of us would answer all of these questions with a shuddering "Yes." But in Missouri and points south they have to be shown—and Prof. W. J. Baerg, entomologist, comes from south of Missouri. He teaches at the University of Arkansas and examines insects for the State Experiment Station, and when he isn't busy at those jobs he goes about the American tropics and subtropics, coaxing all manner of fanged and sting-armed "varmints" to bite him. He has survived all their bites and stings; and in the following article he tells us of the things he has learned from this highly personal kind of experimentation.

By W. J. Baerg



PERFECTLY SAFE to let a tarantula promenade on your arm. She's usually too sluggish to bite, and even if she does it won't be much more serious than a bee sting

A recent newspaper story illustrates how solid a hold the tarantula terror has on the general public. A young man driving in an automobile along a country road suddenly saw a large tarantula on the floor near his feet. Without any hesitation, not even troubling to stop the car, he jumped out. The car ran down an embankment and was wrecked. The man escaped without injury, but he had wasted a good car because of his needless fright. For contrary to the popular notion that they are ferocious and deadly, tarantulas are really very shy and harmless creatures.

I have tried to study the effect of the bite of tarantulas occurring in Arkansas, Texas, New Mexico, California, Durango (Mexico), Honduras, and the Canal Zone. The poison of all these, excepting one, has little or no effect on man. The fangs of a full-grown tarantula are somewhat formidable in size and there is sufficient strength back of them to inflict a wound that is quite painful. Within a period of ten years I have been bitten many times, once or twice by accident; in no case did the effects last longer than from fifteen to twenty minutes. On other people the poison may have more, or less, serious effects. I have not tried the bite on students or assistants. The young lady who does my stenographic work was bitten accidentally by one of the local tarantulas, and the effect was no more that what I have observed on myself.

The exception already mentioned above is a large, husky, blackish species that is very common in the Canal Zone. I found the members of this species especially numerous in Ancon, where they live in holes in the terraces along the streets. After dark they come out to sit in front of the holes, presumably waiting for prey. A bright light suddenly held close to them so dazzles them that they forget to retreat. In this manner I easily secured all the tarantulas needed for experiments.

As is true elsewhere, the tarantulas are here regarded as extremely deadly. The natives will scour the woods for all manner of bird and beast to satisfy the tourist trade, even furnish a boa for the drunken sailor, but when I wanted tarantulas and offered a good bonus, I got exactly nothing. One youngster assured me, "I wouldn't touch one of them for fifty dollars."

On rats this black tarantula caused fairly severe symptoms; however, the rat recovered in about four hours. A guinea pig died about thirty minutes after it was bitten. I let one of them bite me on the little finger. The bite caused considerable swelling and fairly severe pain. However, these effects were local, extending no farther than over the hand. After observing the effects for two hours, I ended the experiment by placing the hand in hot water for thirty minutes.

The tarantula that occurs in Arkansas and other southern and southwestern states is fairly common on the hills of northwest Arkansas. It may be found in holes in the ground which it either appropriates, or digs for itself. It also lives under stones.

In the fall, September or October, the local tarantulas mate. Since the species is decidedly cannibalistic, love-making is a dangerous adventure for the male, who is not only the smaller, but also the less deadly of the sexes. But even if he escapes, as he perhaps usually does, he has only his days of decline to look forward to. In four or six weeks he dies, apparently as a result of complete exhaustion of energy, at an age of about eleven or twelve years.

The females Nature has treated more kindly. Maturing at the age of eleven or twelve years, they continue to live and thrive, producing annually a cocoon containing 500 to 1000 eggs. How long they live no one knows. One of the females in the laboratory was taken ten years ago and is still in the very best of health and vigor. Since tarantulas, like birds, do not show their age, the age of this one can only be estimated at not less than twenty two, and probably much older.

When making the cocoon that is to receive the eggs, the female produces a quantity of silk that is quite prodigious. The cocoon is first laid down in the form of a cradle; on this the eggs are laid and covered with a sheet of silk. The double sheet requires nearly eleven hours of spinning. When rolled up and properly shaped it is about as large as a black walnut from which the hull has been removed.

Tarantulas are (*Turn to next page*)

Tarantulas and Scorpions Not So Poisonous—*Continued*

easily kept in the laboratory and for various reasons make very good pets. They do not seem to fret over their captivity, like caged birds, and require much less attention than goldfish. During the spring and summer months, April to September inclusive, a tarantula needs for food no more than a good-sized grasshopper, or a large cockroach, or even a caterpillar once every five or six days. From October to March they will require no food whatever provided they are kept in a fairly cool place. Like all other spiders they require a fairly constant water supply; this should be provided all through the year.

The manner of feeding is perhaps of some interest. To begin with, the tarantula locates its prey solely by the sense of touch, for so far as is known, it can see little more than an earthworm. That is, it can merely distinguish the difference between daylight and darkness, even though it has eight eyes. When it becomes aware of the presence of a presumably suitable creature, it rears up and extends the palpi and the first two or first four legs. This is the nearest that a tarantula comes to jumping. If the creature then moves within reach of the legs it is very suddenly struck down to be immediately seized by the fangs.

A grasshopper thus seized is crushed and squeezed by means of the fangs till there is nothing left of it but a little pellet of pulpy material. In this process of squeezing the juices out of its victims the tarantula is exceedingly deliberate. One of my larger female tarantulas when supplied with a large bird locust spent about five hours and fifteen minutes with the repast. While so occupied she allowed herself eleven periods of rest, at more or less regular intervals. The rest periods were of no more than one-half to one second duration.

The only poisonous spider in the United States is the so-called Black Widow. This spider is not nearly so formidable looking a creature as are the big, hairy tarantulas. She is much smaller than the tarantulas of banana-bunch fame; in fact, she is not even as large as many of the orb-weaving spiders whose beautifully designed webs decorate our gardens. Like the orb-weavers, however, she has a somewhat disproportionately large abdomen. She is smooth and quite black. The Black Widow is common south of the Mason and Dixon Line and is present or represented by close relatives in all the temperate and tropical regions of the world. The Russian relative is known as Kara-Kurt, meaning Black Wolf.

The Black Widow is about one-half inch long, shiny black in color, with a dark red hour glass figure on the under side. It lives commonly under stones or logs and in various buildings. In a very dry summer it is often induced to move into basements of houses.

The poison of the Black Widow has a surprisingly mild effect on white rats. In scores of tests made on such rats, I have never succeeded in killing a single rat. Following the bite, a rat will appear ill for not longer than an hour or two, and even during this time it does not register any great discomfort.

On man the poison causes a very severe, sharp pain locally, and a dull aching pain in apparently all the muscles of the body. There is a mild paralysis of the diaphragm as manifested by the somewhat forced breathing and speech. All this is accompanied by a low and variable fever. Not expecting any serious effects, I allowed the spider to give me a relatively large dose, and as a result spent three days in the hospital. Excepting under very unusual circumstances, as for instance, a child bitten in the neck, the effect, though exceedingly painful is, I think, rarely fatal.

Centipedes are commonly known in all the temperate and tropical regions of the world. About 800 different kinds have been studied and named. According to popular opinion, they are all dangerously poisonous; however, investigations have shown that they are probably all harmless, so far as the effect of their poison is concerned. I have tried to observe this effect on various experimental animals as well as on myself. Among the few that I have studied are various kinds taken in Arkansas, New Mexico, Durango (Mexico), and the Canal Zone. Although some of the larger centipedes, reaching a length of 4 to 6 inches, have a somewhat painful bite, and hold on like grim death, the poison has no noticeable effect. The pain resulting from the bite disappears in about half an hour. I have never seen any swelling or inflammation resulting from the poison.

The more or less common belief that centipedes can inject poison by means of the claws on their feet is, of course, erroneous. Even the largest species, attaining a length of 12 inches or more, are unable to puncture the human skin with their claws. There are, furthermore, no poison glands in the legs or feet.

Scorpions are likewise well known in the temperate and tropical regions. In the United States they may be found as far north as South Dakota, but they are common only south of the Mason and Dixon Line. About 300 different kinds are known. I have studied scorpions in the same localities named above under centipedes, and have found all but one relatively harmless. The effect of the poison is mostly local and similar to that of a wasp or hornet. The pain is fairly intense and a small whitish disc appears around the puncture. In fifteen minutes or a half an hour these effects disappear.

As is true in the case of bee stings, some people are more susceptible to the effects of the poison than are others. A fairly large scorpion occurring in the Canal Zone will produce in some persons a general effect, a numb feeling in the legs and arms and a lameness in the tongue, persisting for twenty-four hours. As a rule the effect of this scorpion's sting is less serious.

Another scorpion in the Canal Zone, rather blackish in color, has such large pincers that it appears ill-proportioned. However, these pincers are equipped with strong muscles and the scorpion generally uses them in self-defense, rather than the sting. The latter, suffering from disuse, has dwindled in size and strength to the extent that it cannot puncture the human skin.

The one dangerously poisonous scorpion is the so-called Durango scorpion. It is relatively small, as scorpions go, about two inches in length, and occurs more or less commonly in Durango and various other states of Mexico. Apparently it is most numerous in the city of Durango. The cracks and crevices in the adobe walls and numerous hiding places in various ruins furnish such agreeable shelter to scorpions that they are much more common in towns than they are in the surrounding country.

Owing to the (*Turn to next page*)

Food Excesses Increase Diabetes

Dietetics

The disease, diabetes, is on the increase, in spite of the many lives saved by insulin. And the unprecedented prevalence of this metabolic disorder is attributed by experts of the Metropolitan Life Insurance Company to "the dietary excesses practiced by the American people."

In 1927, shortly after the wide use of insulin became established, medical statisticians were surprised to find an increase in the diabetes death rate. There was a further rise in 1928, and now 1929 bids fair to reach the highest figure ever recorded. The death rate for the first three months of this year, 23.8 per 100,000, was the highest ever recorded among the industrial policyholders of the Metropolitan Life Insurance Company, a group widespread throughout the United States and comprising a considerable percentage of the total population. The large increase was due in part to a wide prevalence of influenza and pneumonia which hastened the deaths of a number of diabetics. But apart from such deaths, there has been a large increase in the death rate from diabetes.

Disconcerting as it may seem to the public, physicians and public health workers, to find an increase in diabetes following upon the discovery and use of insulin, the experts of the Metropolitan Life Insurance Company in interpreting the statistics declare that but for the increasing use of insulin the death rate would be still higher.

The fundamental cause of diabetes is unknown. Some change in the pancreas occurs which reduces its output of a secretion which transforms sugar into a form useful for energy and muscle building. Why the pancreas fails, in some cases, to produce a sufficient amount of this ferment is not known, but the resulting condition is diabetes. Insulin, derived from the islands of Langerhans in the pancreas of animals, has this power of converting sugar into usable form. It supplements the reduced amount of pancreatic secretion of the diabetic, but it does not change the diseased condition of the pancreas itself. It is a treatment, but not a cure and not a preventive. It does, however, enable the patient suffering from diabetes to live out his allotted span of life, usually in a fair state of health and comfort.

The use of insulin has increased, a study of fatal cases showed. According to information obtained from physicians insulin was given in over half the cases, or 63 per cent. of the 1,044 for which data were received.

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Tarantulas and Scorpions Not So Poisonous—*Continued*

fact that they constitute a rather serious menace to the town, the government pays a bounty on all live scorpions brought to the City Hall. This bounty, first paid in 1785, has apparently been offered and paid every year since then. During the scorpion season, March to July, many children devote much time to the business of gathering of scorpions; they are known as *alacraneros*. The number of scorpions brought in annually varies somewhere about 100,000. In 1925, 116,000 were brought in. Since then the number has fallen off, and last year only 8,000 were collected.

In former times, when the doctors had not learned how to treat scorpion victims, the Durango scorpion took an unusual toll of from 30 to 50 children in a city of about 40,000 population. The effect, briefly stated, is a paralysis of the respiratory system so that the victim chokes to death, usually within one or two hours' time. Adults, although they may suffer severely from the effects of the poison, rarely succumb to it.

A somewhat surprising feature about the effect of the poison on adults is that bad characters apparently do not suffer from them. In fact, it is alleged that a scorpion stinging such characters dies itself as a result. One of the generals in Durango assured me that he had demonstrated this fact on himself. I urged him to come to my laboratory to repeat the test, but for some reason he did not put in his appearance.

On experimental animals, such as guinea pigs, the action of the venom is exceedingly rapid. A guinea pig on being stung in the hind leg began sneezing violently (the first symptom aside from the pain) in a few minutes; in about thirty minutes it was dead from convulsions.

The remedies employed in former days were mainly sweat producers and diuretics. More recently chloroform has been used with very gratifying results. Victims are given just enough of the anesthetic to go to sleep, and then kept in this state for from two to three hours, when the danger of convulsions is usually over. Within the last few years a serum has been developed by Drs. Carlos de la Pena and Isauro Venzor of Durango, which has so far given very good results.

During most of the year scorpions are quite solitary. As a rule one finds but one, or possibly two under one stone. Late in the fall they become social; as many as thirty or more may be found under a stone. At this time they mate, and previous to mating they indulge in their mating dances. A male and a female will seize each other by the pincers (that is to say, hold hands) and then walk forwards and backwards in a very regular manner.

The young are born alive, sometime during July and August. The family consists of from thirty to forty young. These on being born free themselves from the thin white envelope that encloses them and then proceed to climb onto the mother's back. She, although normally inclined to seize and devour any small creature, even of her own kind, that comes in her reach, appears to have some real affection for her offspring, assisting them in various ways until they have reached a secure foothold. In the event that any little ones fail to get out of the membranous envelope within a reasonable length of time, the mother calmly devours them. The babies remain on the maternal back for ten days or two weeks, after which they must themselves seek food and shelter.

The popular belief that scorpions when surrounded by fire will commit suicide is, of course, founded on error. Although scorpions are somewhat susceptible to the effects of their own poison, they are but slightly so. One scorpion may sting another to death, but never has one been observed to sting itself.

Science News-Letter, June 29, 1929

Measure Temperature of Single Cells

Cytology

Accurate measurements of temperature inside of a single cell of a living organism can be made to within less than one two-thousandth of a degree, using a pair of wires less than one twenty-five-thousandth of an inch in diameter. Methods of making and using these microscopic wires were described by Dr. D. M. Whitaker, of Stanford University, speaking before the meeting of the Pacific Division of the American Association for the Advancement of Science.

To make the microscopic wires, said Dr. Whitaker, an ordinary fine wire is placed in a tube of glass or quartz which melts at a temperature higher than the melting point of the metal, but below its boiling point. Thus for copper wire a glass would be used that melts at a temperature between 1980 degrees Fahrenheit, at which copper melts, and 4190 degrees, at which it boils. Then the glass tube is softened by heat, melting the metal. When the tube is pulled, it can be stretched to a capillary tube of minute dimensions, with the melted metal inside. As the glass cools, the metal "freezes" into a still finer wire.

For obtaining thermocouples, used for the delicate temperature measurements, two different metals are drawn out in the same kind of glass, and then the glass capillary tubes are fused together. A short glass needle is the result, with two metal cores. A little of the glass at the end is removed, exposing the wires. They are then joined together, either by silver-plating or by melting them. The resulting thermocouple, like any similar junction of two such metals, whether large or small, gives off an electric current when heated. With the micro-thermocouple inserted in a cell which is to be studied, operating under a microscope, the current is measured on a sensitive galvanometer. From this current the temperature can be found with great precision.

Science News-Letter, June 29, 1929

A recent invention is a "talking postcard" which has its greeting on a tiny phonograph record.

A scientist trying to find a remedy for dog diseases discovered the method of controlling hookworm in man.

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Edison Discusses Intelligent Atoms

General Science

Since this is Edison Year and his incandescent lamp is shining on all sides in honor of its fiftieth birthday, we may appropriately recall one of the few occasions when Mr. Edison was tempted by reportorial persistency to leave the solid ground where he was occupied with practical problems and to indulge in a little speculation about the constitution of matter. So we reprint from *The Monist* of January, 1893, his interview on "Intelligent Atoms" which created quite a sensation at the time and is of peculiar interest at the present time.

One interesting point is his skepticism in regard to the actuality of the ether which was then commonly considered as real as matter but which Einstein has now discarded as an unnecessary fiction, created, as Edison says, by speculative scientists to hold their theories together. But the distinction between matter and energy which Edison, like everyone else of his generation, regarded as absolute is now dissolving away in the focus of modern thought.

Edison's theory, that "the intelligence of man is the sum of the intelligences of the atoms of which he is composed," while doubtless original with him, was not novel to the world. A college graduate might have told him that his new notion was at least 2,500 years old, that it was substantially the same as the hylozoism or panpsychism held by the early Greek philosophers and Roman Stoics and advocated in more modern times by Fechner and Paulsen in Germany and Thomas Carlyle in England. But Edison would not have cared if he had been told of such prior claimants to his idea because he was not proposing to patent it. And if Edison had been a college graduate he would not have thought of thinking up a theory for himself anyhow. He would wait to have the proper theory taught him at the proper time.

Edison's other anthropomorphic idea, that of the loves and hates of the atoms, has also a long background of history and romance. It was a favorite theory of the early alchemists and as such served as the foundation of the science of chemistry. But Goethe, being a rake as well as a scientist, took this good clean chemical term, "Elective Affinities" and, by making it the title of a romance, gave it a downward trend that dragged it into the divorce court. But the atoms still stick to their strict old-fashioned standards of conduct, no matter what the human race may do. There is no promiscuity among the atoms. Even in the excitement and confusion of a conflagration the carbon and oxygen atoms never lose their heads but seek their mates according to the same laws and instincts as if they were carrying on their courtship in a green leaf on a summer day. If the atoms showed any laxity in this respect, if they should abandon for a moment their peculiar personal preferences for certain other elements, the world would fall into chaos and our own bodies become unmanageable.

In the thirty-six years since this was written scientific experimentation and speculation have been carried on with unprecedented zeal, but most of the questions raised by Mr. Edison —or by the reporters who interviewed him—are still unsettled and his opinions are still pertinent.—E. E. S.

THOMAS A. EDISON in *The Monist*, January, 1893, an article headed "Intelligent Atoms":

My mind is not of a speculative order, it is essentially practical, and when I am making an experiment, I think only of getting something useful, of making electricity perform work.

I don't soar; I keep down pretty close to earth. Of course there are problems in life I can't help thinking about, but I don't try to study them out. It is necessary that they should be studied, and men fitted for that work are doing it. I am not fitted for it. I leave the theoretical study of electricity to the physicists, confining my work to the practical application of the force. It is my belief, however, that every atom of matter is intelligent, deriving energy from the primordial germ. The intelligence of man is, I take it, the sum of the intelligences of the atoms of which he is composed. Every atom has an intelligent power of selection and is always striving to get into harmonious relation with other atoms. The human body is, I think, maintained in its integrity by the intelligent persistence of its atoms, or rather by an agreement between the atoms so to persist. When the harmonious adjustment is destroyed the man dies, and the atoms seek other relations.

I cannot regard the odor of decay but as the result of the efforts of the atoms to dissociate themselves; they want to get away and make new combinations. Man, therefore, may be regarded in some sort as a microcosm of atoms agreeing to constitute his life as long as order and discipline can be maintained. But, of course, there is dissatisfaction, rebellion and anarchy leading eventually to death, and through death to new forms of life. For life I regard as indestructible.

All matter lives, and everything that lives possesses intelligence. Consider growing corn, for example. An atom of oxygen comes flying along the air. It seeks combination with other atoms and goes to the corn, not by chance, but by intention. It is seized by other atoms that need oxygen, and is packed away in the corn where it can do its work. Now carbon, hydrogen and oxygen enter into the composition of every organic substance in one form of arrangement or another. The formula CHO, in fact, is almost universal.

Very well, then, why does a free atom of carbon select any particular one out of 50,000 or more possible positions unless it wants to? I cannot see how we can deny intelligence to this act of volition on the part of the atom. To say that one atom has an affinity for another is simply to use a big word. The atom is conscious if man is conscious, is intelligent if man is intelligent, exercises will-power if man does, is, in its own little way, all that man is. We are told by geologists that in the earliest periods no form of life could exist on the earth.

How do they know that? A crystal is devoid of this vital principle, they say, and yet certain kinds of atoms invariably arrange themselves in a particular way to form a crystal. They did that in geological periods antedating the appearance of any form of life and have been doing it ever since in precisely the same way. Some crystals form in branches like a fern. Why is there not life in the growth of a crystal? Was the vital principle specially created at some particular period of the earth's history, or did (*Turn to next page*)

College Students Report Dreams

Psychology

Being waked up at uncertain intervals during a peaceful night's rest just to tell an experimenter what you have been dreaming about is all in the night's work at the Colgate University Psychological Laboratory.

Four students who took part in this experiment for seven weeks were able to recall a considerable number of dreams if awakened in the early or late stages of a night's rest, according to F. K. Berrien, who reported the results of the experiment to the *Journal of Abnormal and Social Psychology*. The large proportion of dreams recalled in the early stage he attributes to the fact that the mind is still relatively active with the events of the day.

"As sleep grows deeper the mind evidently becomes less active," he states. "And the dreams are less frequent until wakefulness sets in toward morning. With the onset of relatively lighter sleep the sleeper is more affected by outside stimuli such as noises, the weight of the bed clothing, and this may account for the increase in the frequency of dreams in that part of the night."

Judging by these four students, the more emotionally stable an individual is, the less that individual dreams.

Dreams are to be looked upon as rather independent phenomena, the psychologist concludes, for no connection with muscle tension or ordinary physiological processes could be detected.

Science News-Letter, June 29, 1929

Edison on Intelligent Atoms—*Continued*

it exist and control every atom of matter when the earth was molten? I cannot avoid the conclusion that all matter is composed of intelligent atoms and that life and mind are merely synonyms for the aggregation of atomic intelligence.

Of course there is a source of energy. Nature is a perpetual motion machine, and perpetual motion implies a sustaining and impelling force.

When I was in Berlin I met Du Bois-Reymond and, wagging the end of my finger, I said to him, "What is that? What moves that finger?" He said he didn't know; that investigators have for twenty-five years been trying to find out. If anybody could tell him what wagged this finger, the problem of life would be solved.

There are many forms of energy resulting from the combustion of coal under a boiler. Some of these forms we know something about in a practical way, but there may be many others we don't know anything about.

Perhaps electricity will itself be superseded in time, who knows? Now a beefsteak in the human stomach is equivalent to coal under a boiler. By oxidation it excites energy that does work, but what form of energy is it? It is not steam pressure. It acts through the nerve-cells, performs work that can be measured in foot pounds, and can be transformed into electricity, but the actual nature of this force which produces this work—which makes effectual the mandate of the will—is unknown.

It is not magnetism, it doesn't attract iron. It is not electricity—at least such a form of electricity as we are familiar with. Still, here it is necessary to be guarded, because so many different forms of electricity are known to science that it would be rash to say positively that we shall not class vital energy as a form of electrical energy. We cannot argue anything from difference in speed. Nerve-force may travel as fast as electricity, once it gets started. The apparent slowness may be in the brain. It may take an appreciable time for the brain to set the force going.

I made an experiment with a frog's leg that indicates something of the kind. I took a leg that was susceptible to galvanic current. The vibration produced a note that was as high as a piccolo. While the leg was alive it responded to the electrical current; when it was dead it would not respond. After the frog's leg had been lying in the laboratory three days I couldn't make it squeal. The experiment was conclusive as to this point: The vital force in the nerves of the leg was capable of acting with speed enough to induce the vibration of the diaphragm necessary to produce sound.

Certainly this rate of speed is greater than physiologists appear to allow, and it seems reasonable that there is a close affinity between vital energy and electricity. I do not say they are identical; on the contrary, I say they are very like. If one could learn to make vital energy directly without fuel, that is without beefsteak in the stomach, and in such manner that the human system could appropriate it, the elixir of life would no longer be a dream of alchemy. But we have not yet learned to make electricity directly, without the aid of fuel and steam.

I believe this is possible; indeed, I have been experimenting in this direction for some time past. But until we can learn to make electricity, like nature, out of disturbed air, I am afraid the more delicate task of manufacturing vital energy so that it can be bottled and sold at the family grocery store will have to be deferred.

Electricity, by the way, is properly merely a form of energy, and not a fluid. As for the ether which speculative science supposes to exist, I don't know anything about it. Nobody has discovered anything of the kind. In order to make their theories hold together they have, it seems to me, created the ether. But the ether imagined by them is unthinkable to me. I don't say I disagree with them, because I don't pretend to have any theories of that kind, and am not competent to dispute with speculative scientists. All I can say is, my mind is unable to accept the theory. The ether, they say, is as rigid as steel and as soft as butter. I can't catch on to that idea.

I believe that there are only two things in the universe—matter and energy. Matter I can understand to be intelligent, for man himself I regard as so much matter. Energy I know can take various forms, and manifest itself in various ways. I can understand also that it works not only upon, but through, matter. What this matter is, what this energy is, I do not know.

However, it is possible that it is simply matter and energy, and that any desire to know too much about the whole question should be diagnosed as a disease; such a disease as German doctors are said to have discovered among the students of their universities—the disease of asking questions.

Science News-Letter, June 29, 1929

CLASSICS OF SCIENCE:

Herschel Discovers Uranus

Astronomy

To the ancients the magic number seven was established in the heavens by the existence of the sun, the moon, and the five planets: Mercury, Venus, Mars, Jupiter and Saturn. Copernicus heliocentric theory made the earth and the sun exchange places in this system, but it remained for Herschel to add another planet to the perfect number.

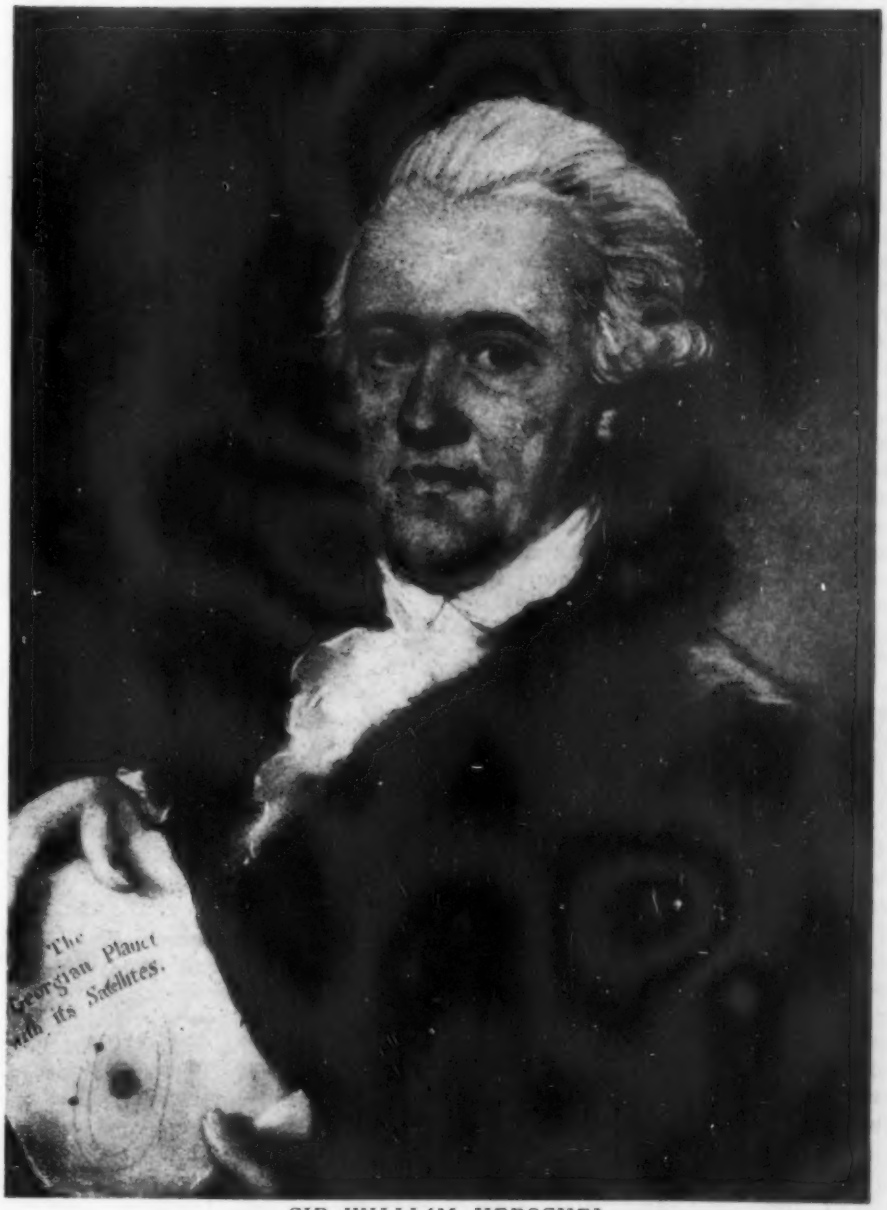
THE SCIENTIFIC PAPERS OF SIR WILLLIAM HERSCHEL including early papers hitherto unpublished, collected and edited under the direction of a joint committee of the Royal Society and the Royal Astronomical Society. Vol. I, London, 1912.

Account of a Comet

Read April 26, 1781.

On Tuesday the 13th of March, between ten and eleven in the evening, while I was examining the small stars in the neighbourhood of H Geminorum, I perceived one that appeared visibly larger than the rest: being struck with its uncommon magnitude, I compared it to H Geminorum and the small star in the quartile between Auriga and Gemini, and finding it so much larger than either of them, suspected it to be a comet.

I was then engaged in a series of observations on the parallax of the fixed stars, which I hope soon to have the honor of laying before the Royal Society; and those observations requiring very high powers, I had already at hand the several magnifiers of 227, 460, 932, 1536, 2010, &c., all which I have successfully used upon that occasion. The power I had on when I first saw the comet was 227. From experience I knew that the diameters of the fixed stars are not proportionally magnified with higher powers, as the planets are; therefore I now put on the powers of 460 and 932, and found the diameter of the comet increased in proportion to the power, as it ought to be, on a supposition of its not being a fixed star, while the diameters of the stars to which I compared it were not increased in the same ratio. Moreover, the comet being magnified much beyond what its light would admit of, appeared hazy and ill-defined with these great powers, while the stars preserved that lustre and distinctness which from many thousand observations I knew they would retain. The sequel has shewn that my surmises were well founded, this proving to be the Comet we have lately observed. . . .



SIR WILLIAM HERSCHEL

A Letter from William Herschel, Esq. F. R. S. to Sir Joseph Banks, Bart. P. R. S.

Sir,—By the observations of the most eminent Astronomers in Europe it appears, that the new star, which I had the honour of pointing out to them in March, 1781, is a Primary Planet of our Solar System. A body so nearly related to us by its similar condition and situation, in the unbounded expanse of the starry heavens, must often be the subject of the conversation, not only of astronomers, but of every lover of science in general. This consideration then makes it necessary to give it a name, whereby it may be distinguished from the rest of the planets and fixed stars.

In the fabulous ages of ancient times the appellations of Mercury, Venus, Mars, Jupiter, and Saturn, were given to the Planets, as being the names of their principal heroes and divinities. In the present more philosophical æra, it would hardly be allowable to have recourse to the same method, and call on Juno, Pallas, Apollo, or Minerva, for a name to our new (*Turn to next page*)

Discovery of Uranus—*Continued*

heavenly body. The first consideration in any particular event, or remarkable incident, seems to be its chronology: if in any future age it should be asked, *when* this last-found Planet was discovered? It would be a very satisfactory answer to say, "In the Reign of King George the Third." As a philosopher then, the name of Georgium Sidus presents itself to me, as an appellation which will conveniently convey the information of the time and country where and when it was brought to view. But as a subject of the best of Kings, who is the liberal protector of every art and science;—as a native of the country from whence this Illustrious Family was called to the British throne;—as a member of that Society, which flourishes by the distinguished liberality of its Royal Patron;—and, last of all, as a person now more immediately under the protection of this excellent Monarch, and owing every thing to His unlimited bounty;—I cannot but wish to take this opportunity of expressing my sense of gratitude by giving the name Georgium Sidus,

Georgium Sidus
——jam nunc assuesce vocari.
VIRG. Georg.

to a star, which (with respect to us) first began to shine under His auspicious reign.

By addressing this letter to you, SIR, as President of the Royal Society, I take the most effectual method of communicating that name to the Literati of Europe, which I hope they will receive with pleasure. I have the honour to be, with the greatest respect,

SIR,
Your most humble
and most obedient servant,
W. HERSCHEL.

An Account of the Discovery of Two Satellites revolving round the Georgian *Planet*

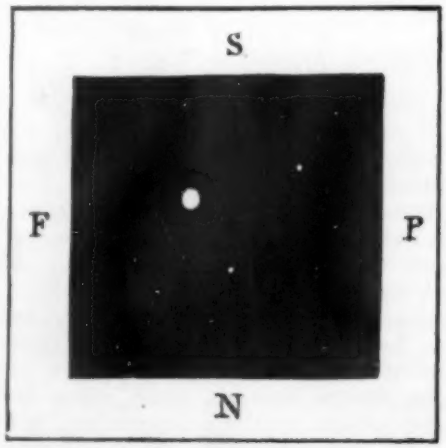
Read Feb. 15, 1787.

The great distance of the Georgian planet, and its present situation in a part of the zodiac which is scattered over with a multitude of small stars, has rendered it uncommonly difficult to determine whether, like Jupiter and Saturn, it be attended by satellites. In pursuit of this inquiry, having frequently directed large telescopes to this remote planet, and finding myself continually disappointed, I ascribed my failure to the want of sufficient light in the instruments I used; and, for a while, gave over the attempt.

In the beginning of last month, however, I was often surprised when I reviewed nebulæ that had been seen in former *sweeps,* to find how much brighter they appeared, and with how much greater facility I saw them. The cause of it could be no other than the quantity of light that was gained by laying aside the small speculum, and introducing the *Front-view;* an account of which has been inserted, by way of note, to the Catalogue of Nebulæ contained in the *Philosophical Transactions,* vol. LXXVI, p. 499.

It would not have been pardonable to neglect such an advantage, when there was a particular object in view, where an accession of light was of the utmost consequence; and I wondered why it had not struck me sooner. The 11th of January, therefore, in the course of my general review of the heavens, I selected a *sweep* which led to the Georgian planet; and, while it passed the meridian, I perceived near its disk, and within a few of its diameters, some very faint stars whose places I noted down with great care.

The next day, when the planet returned to the meridian, I looked with a most scrutinizing eye for my small stars, and perceived that two of them were missing. Had I been less acquainted with optical deceptions, I should immediately have announced the existence of one or more satellites to our new planet; but it was necessary that I should have no doubts. The least haziness, otherwise imperceptible, may often obscure small stars; and I judged, therefore, that nothing less than a series of observations ought to satisfy me, in a case of this importance. To this end I noticed all the small stars that were near the planet the 14th, 17th, 18th, and 24th of January, and the 4th and 5th of February; and though, at the end of this time, I had no longer any doubt of the existence of at least one satellite, I thought it right to defer this communication till I could have an opportunity of seeing it actually in motion. Accordingly I began to pursue this satellite on February the 7th, about six o'clock in the evening, and kept it in view till three in the morning on February the 8th; at which time, on account of the situation of my house, which intercepts a view of part of the ecliptic, I was obliged to give over the chace: and during those nine hours I saw this satellite faithfully attend its primary planet, and at the same time keep on, in its own course, by describing a considerable arch of its proper orbit.



HERSCHEL'S DIAGRAM

While I was chiefly attending to the motion of this satellite, I did not forget to follow another small star, which I was pretty well assured was also a satellite, especially as I had, on the night of the 14th of January, observed two small stars which were wanting the 17th, and again missed other two the 24th which had been noticed the 18th; but, whether owing to my great attention to the former satellite, or to the closeness of this latter, which was nearly hidden in the rays of the planet, I could not be well assured of its motion. Indeed, towards morning, when a change of place, in so considerable an interval as nine hours, would have been most conspicuous, the moon interfered with the faint light of this satellite, so that I could no longer perceive it.

The first moment that offered for continuing these observations was on February the 9th, when I saw my first discovered satellite nearly in the place where I expected to find it. I perceived also, that the next supposed satellite was not in the situation where I had left it on the 7th, and could now distinguish very plainly that it had advanced in its orbit, since that day, in the same direction with the other satellite, but at a quicker rate. Hence it is evident, that it (*Turn to next page*)

Ant Mound Has 8,239 Inhabitants

Entomology

When the 1930 U. S. Census gets under way it will take in many kinds of live stock, but will perforce have to omit many other kinds, important though these may be in the economic life of our country; among these, ants. The importance of the ant is conceded without argument, especially on picnics and in pantries. But counting the ant population is too much of a job.

Except when a university professor really gets his curiosity aroused. Prof. A. E. Andrews, of the Johns Hopkins University, did not wait for the census year, but made a count of the six-legged citizens of a good-sized ant mound near Baltimore last fall and this spring. In the forthcoming issue of the *Quarterly Review of Biology* he tells of his findings.

The census involved the destruction of the mound, for the ants were so active during warm weather that it was necessary to wait until autumnal chill had stupefied the insects. Then the mound was carefully picked to pieces and most of the ants removed and counted. The task was completed during the following spring.

A total of 8,239 ants were found in the galleries of the earthwork. Prof. Andrews thinks this represents a fair average for an ordinary ant mound of the species examined. Some European counts have shown three times that many, but other estimates, running as high as half a million ants per mound, he thinks are too high.

In one forested area in Baltimore County, Prof. Andrews counted 200 ant mounds, and in another place, near Washington, 989 mounds. Allowing an average population of 10,000 ants per mound, the first colony would comprise a total of about 2,000,000 insects, and the second something over 8,000,000. Inasmuch as this species is accused of harming young trees, the existence of the ants in such large numbers becomes a matter of economic moment.

Deafness Traced

Medicine

Diseased ear conditions that cause deafness are usually due to disease in the nose, Dr. Edmund P. Fowler of New York declared in a report of clinical investigations at the Manhattan Eye, Ear and Throat Hospital.

Speaking before the American Federation of Organizations for the Hard of Hearing, Dr. Fowler also stated that variations in deafness, that is, improved or diminished hearing, have been found to be closely associated with improvement or deterioration in the nasal disease conditions.

X-ray examinations of a large number of children attending the clinic on ear diseases revealed pathological conditions in the nasal sinuses, he explained. Treatment of this condition resulted in improving the hearing of more than 50 per cent. of the usual chronic cases of deafness in these children, and in 25 per cent. the improvement is marked.

The children's hearing has been tested from time to time and X-ray examinations have been made.

Science News-Letter, June 29, 1929

Herschel Discovers Uranus—*Continued*

moves in a more contracted orbit; and I shall therefore call it in future the first satellite, though last discovered, or rather last ascertained; since I do not doubt but that I saw them both, for the first time, on the same day, which was January the 11th, 1787.

I now directed all my attention to the first satellite, and had an opportunity to see it for about three hours and a quarter; during which time, as far as one might judge, it preserved its course. The interval which the cloudy weather had afforded was, however, rather too short for seeing its motion sufficiently, so that I deferred a final judgment till the 10th; and, in order to put my theory of these two satellites to a trial, I made a sketch on paper, to point out before-hand their situation with respect to the planet, and its parallel of declination.

The long expected evening came on, and, notwithstanding the most unfavourable appearance of dark weather, it cleared up at last. And the heavens now displayed the original of my drawing, by shewing in the situation I had delineated them, *The Georgian Planet attended by two Satellites.*

I confess that this scene appeared to me with additional beauty, as the little secondary planets seemed to give a dignity to the primary one, which raises it into a more conspicuous situation among the great bodies of our solar system.

For upwards of five hours I saw them go on together, each pursuing its own track; and I left them situated, about two o'clock in the morning on February the 11th, as they are represented in the figure, fig. 1. The letters S. N. P. F, denote the south, north, preceding and following parts of the heavens, as they are seen, by the *front-view*, in my telescope. The south preceding satellite is the second, or that whose motion was first ascertained; the other is that which moves in a smaller orbit, or what I have called the first satellite; and the direction of their motion is according to the order P, S, F, N, of the letters.

I have not seen them long enough to assign their periodical times with great accuracy; but suppose that the first performs a synodical revolution in about eight days and three-quarters, and the second in nearly thirteen days and an half.

Their orbits make a considerable angle with the ecliptic; but to assign the real quantity of this inclination, with many other particulars, will require a great deal of attention, and much contrivance: for, as estimations by the eye cannot but be extremely fallacious, I do not expect to give a good account of their orbits till I can bring some of my micrometers to bear upon them; which, these last nights, I have in vain attempted, their light being so feeble as not to suffer the least illumination, and that of the planet not being strong enough to render the small silk-worm's threads of my delicate micrometers visible. I have, nevertheless, several resources in view, and do not despair of succeeding pretty well in the end.

W. HERSCHEL.

Slough, near Windsor,
February 11, 1787.

Frederick William Herschel (1738-1822) by the time he had reached his early thirties was a famous organist and composer in Bath, England, having migrated there from his home in Hanover, Germany. From harmony his studies led him to astronomy. With telescopes of his own making he set out upon a comprehensive survey of the heavens. In the course of his observations he discovered the object, at first thought to be a comet, which proved to be the first member of our family of planets to be discovered within historic time.

Science News-Letter, June 29, 1929

Reference Books for the Teacher

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By William H. Atwood and Elwood D. Heiss, State Teachers College, Milwaukee. Edited by S. R. Powers, Columbia University.

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By Francis D. C. Curtis, Ph.D., University of Michigan.

This monograph is the report of a diligent search of the pedagogical literature in an endeavor to make available for convenient reference and ready comparison two types of research studies and investigations; those placing major emphasis upon learning and those placing major emphasis on the curriculum.

Folsom—ENTOMOLOGY WITH SPECIAL REFERENCE TO ITS ECOLOGICAL ASPECTS

308 Illustrations. 502 Pages. Cloth, $4.00

By Justus Watson Folsom, University of Illinois.

A biological treatment of entomology, giving a comprehensive and concise account of insects in a style characterized to make it a most successful class room text.

Frank—HOW TO TEACH GENERAL SCIENCE

240 Pages. Cloth, $2.00

By J. O. Frank, Wisconsin State Normal School. Edited by S. R. Powers, Columbia University.

It presents the many practical problems which concern the vast majority of science teachers. It is adapted to class use for courses in science education, and is an invaluable reference book for the administrator and teacher.

Gager—GENERAL BOTANY

689 Illustrations. 1056 Pages. Cloth, $4.00

By C. Stuart Gager, Director of the Brooklyn Botanic Garden.

It stresses both the cultural and the practical side of the subject and focuses attention upon the seed plants and upon facts and principles of general biological significance, assigning to the lower plants a relatively subordinate position.

Gould—NEW MEDICAL DICTIONARY

2nd Edition. Illustrated. 1522 Pages

Flexible Binding, $7.00. With Thumb Index, $7.50

By George M. Gould, A.M., M.D. Edited by R. J. E. Scott, Fellow of the New York Academy of Medicine.

It contains the pronunciation and definition of over 83,000 words used in medicine and the related sciences and contains numerous tables of interest to the students and teachers of science in colleges and universities.

Hackh—CHEMICAL REACTIONS AND THEIR EQUATIONS

2d Edition. 138 Pages. Cloth, $2.00

By Ingo W. Hackh, Professor of Biochemistry, College of Physicians and Surgeons, San Francisco.

This little volume supplies the material and expounds the principles of balancing equations. It confines itself to a consideration of chemical equations from a technical and arithmetical standpoint.

Pratt—MANUAL OF LAND AND FRESH WATER VERTEBRATE ANIMALS OF THE UNITED STATES

184 Illustrations. 422 Pages. Cloth, $6.00

By Henry S. Pratt, Professor of Biology, Haverford College.

The manual furnishes accurate diagnostic descriptions of the land and fresh water vertebrate animals of the United States, together with the analytical keys by means of which they can be readily identified.

Reese—OUTLINES OF ECONOMIC ZOOLOGY

2nd Edition. 194 Illustrations. 318 Pages. Cloth, $2.50

By Albert M. Reese, Professor of Zoology, West Virginia University.

The economic relationships of the various forms of animal life to man are discussed.

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PUBLISHERS 1012 WALNUT STREET, PHILADELPHIA

Nature Ramblings

By Frank Thone

Badger

The very ideal of solitary, stolid, surly truculence is embodied in the squat frame of the badger. His flat shape and short, bandy legs have earned for him the nickname of door-mat". But let no one presume upon superficial similarities to treat him as such. His hole is his donjon keep, and woe to the dog or man who would molest him. He looks out upon the world and loves it not, nor does he care a broken bone—another animal's broken bone, of course—that it loves him just as little.

Yet when he is young the badger seems to be not a bad fellow at all. A few years ago, E. J. Sawyer, government naturalist at Yellowstone National Park, captured two young badgers and raised them by hand. They took very well to the bottle, and seemed to imbibe a good deal of the milk of human kindness as well, for they became quite tame, and would come ambling up to play with their strange nurse whenever he crawled into their cage and whistled for them to come out of their shelter. The badger cage came to be one of the great attractions at the park headquarters.

Mr. Sawyer reported also on his observations of the adult badger's method of hunting. It would seem that a heavy animal with such short legs would not have much luck pursuing such agile prey as the picket-pin gopher ,and would have to lie in wait until chance brought one of them within reach of a sudden pounce. Yet the ones that the naturalist watched captured their prey simply by doggedly, persistently running the rodents down, rushing after one and then another, until a victim was finally seized.

Science News-Letter, June 29, 1929

The bald eagle is so called because the white plumage on its head and neck suggests baldness.

First Glances at New Books

Ants, Bees and Wasps—Sir John Lubbock—*Dutton* ($3.75). The social insects have been fortunate in their writers. There is more real literature in this field than in almost any branch of science. Such writers as Lubbock, Fabre, Wheeler, Forel, Maeterlinck, and the Peckhams have attracted a large audience of readers outside the strictly scientific circle, and the study of these insects remains one of the very few fields of research still open to the amateur observer. Lord Avebury, better known as Sir John Lubbock, was one of the first to explore this rich territory, and the record of his observations on ants, bees and wasps remains a model of scientific investigation as well as of interesting writing. But since its publication in 1887 a vast amount of more thorough research work has been done upon the question of the senses, intelligence and power of communication of insects, and therefore this new and annotated edition containing one hundred pages on recent researches is just what is needed both by the general reader and the professional entomologist.

Entomology
Science News-Letter, June 29, 1929

First Report of the Committee on Soil Erosion—A. G. McCall and others—*U. S. Dept. of Agriculture.* A program for soil erosion, moisture conservation and stream regulation research. Considering the rapidity with which the topsoil birthright of this nation is slipping into the rivers and thence to the sea, the committee behind this pamphlet is to be commended for rapidity in getting into action.

Agronomy
Science News-Letter, June 29, 1929

The Faunal Areas of Southern Arizona: A Study in Animal Distribution — H. S. Swarth — *Proc. Calif. Acad. Sciences,* Vol. XVIII, No. 12. Of interest to students of animal ecology and taxonomy.

Zoology
Science News-Letter, June 29, 1929

Notes on Some Oriental Sapromyzid Flies (Diptera), with Particular Reference to the Philippine Species—J. R. Malloch —*Govt. Printing Office.* Of interest to dipterologists.

Entomology
Science News-Letter, June 29, 1929

Yearbook of Agriculture, 1928—*U. S. Govt. Printing Office* ($1.50). The U. S. Department of Agriculture has undertaken to "sell" itself to the average reader. This is the third of a series of yearly handbooks showing that there's something besides dry-as-dust formulæ and statistics produced in the bureaus of that department.

Agriculture
Science News-Letter, June 29, 1929

A Revision of the Wood-Warbler Genus Besileuterus and Its Allies—W. E. Clyde Todd—*Govt. Printing Office.* Of interest to systematic ornithologists.

Ornithology
Science News-Letter, June 29, 1929

A Travelog of Birds—*Cornell Rural School Leaflet* (free). An exceptionally good number of a series published for free distribution to teachers in New York State.

Ornithology
Science News-Letter, June 29, 1929

Land Snails from Hawaii, Christmas Island, and Samoa—H. A. Pilsbry and others—*Bernice P. Bishop Museum, Honolulu.* For many years the land snails of the Pacific islands have been classic material in the study of the evolutionist. This pamphlet adds its significant bit to the data.

Conchology
Science News-Letter, June 29, 1929

Biology Experiment Sheets—S. R. Safir—*World Book Co.* (75c). A well-gotten-up laboratory notebook for use in elementary biology courses.

Biology
Science News-Letter, June 29, 1929

Life History of the Lake Herring of Lake Huron as Revealed by Its Scales, with a Critique of the Scale Method—John Van Oosten—*Govt. Printing Office* (65c). A close study of the life history of an important freshwater fish. Of interest chiefly to fisheries men.

Ichthyology
Science News-Letter, June 29, 1929

Migratory-Bird Treaty-Act Regulations and Text of Federal Laws Relating to Game and Birds—*U. S. Govt. Printing Office.* Of interest to all persons interested in the welfare and conservation of American game and song birds.

Ornithology—Government
Science News-Letter, June 29, 1929

First Glances at New Books—*Continued*

DER ZUECHTER—Edited by Edwin Baur—*Julius Springer, Berlin* (RM 7.50 yearly; single number RM 3). The first issue of a new German journal, devoted to theoretical and applied genetics, contains articles on breeding and cytology, the possibilities of producing new varieties through artificially induced mutations, recessive mutations in a breed of swine, xenia in barley, the breeding of gall-proof potatoes, etc. The journal is evidently intended for an audience in Germany comparable to that reached by the *Journal of Heredity* in this country; it is well worth a place on the reference table of any American biology department that has an adequate library fund.

Genetics
Science News-Letter, June 29, 1929

ORGANIZATION UND GESTALT IM BEREICH DER BLUETE—Wilhelm Troll—*Julius Springer, Berlin* (RM 39). Since the war, German scholars have applied themselves with renewed vigor to the painstaking and thoroughgoing researches that made the classic development of German science in the nineteenth century the wonder of the world. The present work, devoted to a more exhaustive organographic and morphological description of floral organs than has hitherto ben available in one volume, is an excellent example of the new day in German botany. It will be welcomed by American botanists.

Botany
Science News-Letter, June 29, 1929

KEY-CATALOGUE OF INSECTS OF IMPORTANCE IN PUBLIC HEALTH—C. W. Stiles and Albert Hassall—*Govt. Printing Office* (20c). With medical entomology assuming an ever-increasing importance, public hygienists and workers in related fields will find this pamphlet a useful addition to their reference shelves.

Entomology—Hygiene
Science News-Letter, June 29, 1929

EDUCATIONAL ACHIEVEMENT OF PROBLEM CHILDREN—Richard H. Paynter and Phyllis Blanchard—*Commonwealth Fund*. A study of more than 300 children in Los Angeles and Philadelphia, accompanied by a statistical analysis of their physical, mental, and behavior traits and their home background, as well as their school achievement.

Education—Psychology
Science News-Letter, June 29, 1929

THE CHILD OF CIRCUMSTANCE—Albert Wilson—*William Wood and Co., N. Y.* ($6). The author, who was a well known British physician and a specialist in problems of crime, sets forth the theory that the criminal has a child's brain in a grown-up body. This statement does not, however, give an idea of the scope and interest of the book, which is intended for the general public, rather than for sociologists. A great mass of facts on crime is presented and as the material is of European origin the point of view and the illustrations are often different from the standard material used in American works. One section of the book is devoted to penology in various countries of the world. Other sections describe types of criminal and types of mentality that produce crime.

Sociology—Psychiatry
Science News-Letter, June 29, 1929

ANCIENT TAHITI—Teuira Henry—*Bernice P. Bishop Museum, Honolulu*. A comprehensive, almost encyclopedic work on the old native customs, legends, and religious beliefs of this famous Polynesian island. The material was collected by the Rev. J. M. Orsmond, who lived in the Society Islands from 1817 to 1856 and recorded with great interest the information that the natives related. His granddaughter, Miss Henry, took over the task of preparing for publication the voluminous manuscript which Orsmond never put into print, and the greater part of her life was devoted to this work.

Ethnology
Science News-Letter, June 29, 1929

INVESTIGATION OF THE PHYSICAL CONDITIONS CONTROLLING SPAWNING OF OYSTERS AND THE OCCURRENCE, DISTRIBUTION, AND SETTING OF OYSTER LARVAE IN MILFORD HARBOR, CONNECTICUT—H. F. Prytherch—*U. S. Govt. Printing Office* (25c). A report of a special study on the life of the oyster in a typical North Atlantic coast bay.

Science News-Letter, June 29, 1929

A. C. RADIO GUIDE—Kenneth A. Hathaway—*American Technical Society (Chicago)* ($1.50). Full details of operation of radio receivers and speakers on alternating current are contained in this useful little book.

Radio
Science News-Letter, June 29, 1929

THE PYROLYSIS OF CARBON COMPOUNDS—Charles Dewitt Hurd—*Chemical Catalog Co.* ($12.50). This is one of the largest and most important of the Monograph Series of the American Chemical Society, since it covers the entire theory of the breaking up of wood, coal and petroleum by the action of heat. Upon the product of such destructive distillation our modern civilization is based, yet it has only been in recent years that the study of the reactions that occur inside the sealed retort have been systematically and scientifically studied. Already the effect of this research has made itself felt in our most sensitive spot, our pocketbook, in the production of gasoline for the feeding of automobiles and the lacquers for the varnishing of them, and in other innumerable applications of which the chemistry is discussed in the 800 pages of this volume.

Chemistry
Science News-Letter, June 29, 1929

PSYCHOLOGY AND PROFITS—Donald A. Laird—*B. C. Forbes* ($3.50). Dr. Laird is a college professor who believes that as fast as psychologists discover new ways of meeting everyday problems the facts should be put to work. In this readable book he sets forth very simply some of the ways in which an individual can make use of psychological facts and findings in order to make work and home life less fatiguing, happier, and more effective.

Psychology
Science News-Letter, June 29, 1929

ATTILA THE SCOURGE OF GOD—Marcel Brion—*McBride* ($3.50). A straight-forward, detailed account of the confused strategies, diplomacies, and wild attacks of the Huns in their conquest of the civilized world. The author has refrained from much use of imaginative details or interpretations of Attila's behavior. The biography is neither impressionistic nor psychoanalytic; it sets forth the facts for the enlightenment of the reader on an unusual character who played a dramatic role in history.

History
Science News-Letter, June 29, 1929

FORESTRY ALMANAC—*American Tree Association* ($1). The 1929 edition of a very useful and informative forest handbook.

Forestry
Science News-Letter, June 29, 1929